Embodied cognitive ecosophy: the relationship of mind, body, meaning and ecology

Jones, Derek. 2017. "Embodied cognitive ecosophy: The relationship of mind, body, meaning and ecology." *Geografiska Annaler: Series B, Human Geography* 99(2), pp. 156–171. doi: 10.1080/04353684.2017.1306971.

Embodied cognitive ecosophy: The relationship of mind, body, meaning and ecology

Derek Jones

School of Engineering and Innovation, The Open University, United Kingdom

Derek.jones@open.ac.uk

ORCID: 0000-0002-9347-4306 http://orcid.org/0000-0002-9347-4306

Embodied cognitive ecosophy: The relationship of mind, body, meaning and ecology

The concept of embodied cognition has had a major impact in a number of disciplines. The extent of its consequences on general knowledge and epistemology are still being explored. Embodied cognition in human geography has its own traditions and discourses but these have become somewhat isolated in the discipline itself. This paper argues that findings in other disciplines are of value in reconceptualising embodied cognition in human geography and this is explored by reconsidering the concept of ecosophy. Criticisms of ecosophy as a theory are considered and recent work in embodied cognition is applied to consider how such criticisms might be addressed. An updated conceptualisation is proposed, the *embodied cognitive ecosophy*, and three characteristics arising from this criticism and synthesis are presented with a view to inform future discussions of ecosophy and emotional geography.

Keywords: ecosophy; embodied cognition; ecology; epistemology; ontology

1 Introduction

Embodiment has its own particular set of discourses in human geography, and, as Simonsen (2005) notes, the literature on its importance with respect to knowledge continues to expanded. Specifically, embodied cognition has been explored mainly with the body as an object of *coming to know* (for recent examples see: Nash 2000; Longhurst, Ho, and Johnston 2008; Colls 2012) and over the past few decades the emergence and development of emotions and affect in knowing have developed significantly, if slightly problematically (for recent examples see: Anderson 2004; Pain 2009; McEwan and Goodman 2010). But what has been less apparent have been detailed translations of ideas to and from other disciplines, with the obvious exception of philosophy.

Embodied cognition has been established for some time as a central concept in

particular disciplines, such as psychology (e.g. Velmans 1990), cognitive science (e.g. Kiverstein 2012), and cognitive neurolinguistics (e.g. Lakoff and Johnson 1980). More recently it has also emerged in other subjects, where normative thinking and theories led to limits or prevented new ideas emerging, such as artificial intelligence (e.g. Mingers 2001), information theory (e.g. Landauer 1996), and even design (Chawda et al. 2005; Norman 2005) and architecture (Mallgrave 2013). But precise definitions, suitable applications and the extents of embodiment in context(s) are still debated (A. D. Wilson and Golonka 2013) and these are normally confined to particular disciplines, leading to the isolation and reinforcement of some concepts that may no longer be applicable or tenable when interdisciplinary critiques are applied. It remains difficult to move beyond what might be conceived of as 'normal' thinking in Khun's (1962), 'institutional' sense.

The commonality in and between these themes is 'our self-evidently more-than-human, more-than-textual, multisensual worlds' (Lorimer 2005) or, in grounded research, the 'messy space between people and things' (Koskinen et al. 2011), often referred to as non-representational (e.g. Harrison 2000; Pile 2010). The unique strength of human geography as a domain is to act as a 'place' for such discourses is hopefully obvious (Lee et al. 2016). But there are few contributions to human geography that take the grounded and pragmatic approach to embodied cognition that can be found in other domains – to recognise that cognition is physiologically situated and to critically consider the consequences that may arise from this. As Searle noted in the domain of artificial intelligence :

> The single most surprising discovery that I have made in discussing these issues is that many AI workers are quite shocked by my idea that actual human mental phenomena might be dependent on actual physical/chemical properties of actual human brains. (Searle 1980)

It will be argued that normative, ontological views of embodied cognition are useful but limited when applied in particular knowledge domains and that the application of embodied cognition has an effect on such knowledge in itself. If we adopt more recent views of embodied cognitive contexts, particularly those emerging in human geography, a new domain-extended view of embodied cognition may emerge, requiring a wider transdisciplinary view to be taken. By this view, the boundary of embodied cognition is certainly extended far beyond any simple, isolated subjectivities, such as duality of mind and environment.

This paper presents such an exploration, taking a pragmatic approach through the use of discussions in both cognitive neuroscience and human geography, leading to a surprisingly rich 'embodied cognitive ecosophy'. It builds on Simonsen's observation that embodiment has not fully 'reinstated' the body in philosophy, particularly in dialogues and critiques in human geography (Simonsen 2005). In doing so, it contributes to the wider conversation and discourse in emotional geography and in particular providing a response to Pile's question of why emotional geography needs attention and the need to take account of other 'styles' of research along this theme (Pile 2010).

Starting with normative (mainly ontological) views of embodied cognition, the extent boundaries of such epistemologies are questioned and in doing so a view of both what we know and how we come to know it are exposed. A critical analysis of the concepts of ecosophy set out by Arne Næss and Felix Guattari and their emergence from Bateson's ideas of ecology of embodiment, provides a slightly altered definition of 'environment' by understanding ecology to be conceptual as well as embodied. By synthesising these ideas, some of the basic criticisms of ecosophical underpinnings can be addressed and expanded to produce a simpler *embodied cognitive ecosophy*. Three

characteristics of such a conceptualisation are presented to summarise the overall argument.

2 Mind, body and other dualities

2.1 Dividing the world

Western traditions of knowledge have encouraged and celebrated division and reductionist methods in thinking to ask questions of the world around us. The success of such approaches has enabled us to explore and expand our knowledge but it also contains its own inherent limits in terms of containing and framing that knowledge. This is particularly true in the traditional (and enduring) division of mind and body, most famously articulated through Descartes' statement "Cogito Ergo Sum" (Descartes 2008). This legacy from the Platonic tradition, through enlightenment thinking, and embodied in modern rationalism, clearly articulates the supremacy of mind over body, and then bodies over everything else, providing a view of the world as well as a view of knowing the world. This conflation of knowledge-of and knowledge-in the world is perhaps the most important, but less frequently discussed, legacy – one which still provokes intense philosophical debate (e.g. Johnson and Lakoff 2002).

Empirically, Descartes' argument depends on there being some reality that maps directly to human perception and thereby conception – that the relationship is reductive and perfectly linear (Velmans 1990). Damasio (2006) provides the clearest evidence and examples in neuroscience to contradict the rationality of Descartes' position: rather than the 'I think' leading to being, it is our very physical existence that enables thinking to take place. We can no more separate thinking from our physical bodies than we can separate perception or any other cognitive activity. There is no mapping between discrete elements in the world and particulars in our mind. This linear-mechanistic view

of the human body, itself a product of enlightenment reductionism, is no longer generally accepted as rationally capable in terms of relating the metaphysical implication of 'mind' with the physical reality of 'body'. There is no need to invoke Dennett's (2013) 'wonder tissue' to explain what is, after all, a human-created paradox.

At the same time, a simple denial of Descartes' duality does nothing to explain the complexities of interrelation noted in the introduction. Often this is actually a human problem, not a methodological one: the failure to recognise that reductionist thinking is valuable *within* a context. For example, the scientific method is one of the pinnacles of human achievement because it is a method, process and human system of 'coming to know'. It is not, in itself, reductionist – reductionism is applied to useful purpose as part of the method (and then only when needed). For an example of the limitations of pure reductionism and the need to 'un-reduce', see Quine (1951).

But there are now too many findings in a range of subjects that are identifying limitations with such separation. As Guattari observes:

> "…it is not sufficient to think in order to be, as Descartes declares, since all sorts of other ways of existing have already established themselves outside consciousness." (Guattari 2000, 35)

We are left with the problem of having to put these pieces back together and consider what embodied cognition might be.

2.2 Mind and body

There are few single, agreed definitions of what embodied cognition is (Kiverstein 2012; A. D. Wilson and Golonka 2013). Most current theories accept that cognition arises from the physical elements that make up the human body but to state precisely which elements may be considered part of an embodied cognitive system, and which are

not, is somewhat harder. Then, too, cognition is not limited to our brain; it is distributed across our entire neural system and these relationships are bidirectional (or, more accurately, inter-relational): for example, our hands can shape what (and how) we think; and what we think can be reflected in our hands (F. R. Wilson 1998). This is perhaps less surprising when you consider how much cognition actually takes place in our hands when it is defined as neural activity: not all of the 'thinking' we do with our hands takes place in the brain.

Most normative views of embodied cognition ask questions of the boundary of mind and body and the literature shows that the majority of thinking is still ontological: i.e. presented in terms of where *in the body* this boundary might occur. That is, there remains a reductive, normative attitude that the mind and body are in some way particularly and especially related to consciousness and being human. Here, we momentarily ignore the difficulties of what 'consciousness' or 'mind' might mean (more on this later).

To demonstrate the range and spectrum of views of the extent boundary of embodied cognition, consider Margaret Wilson's *Six views of embodied cognition* (M. Wilson 2002):

(1) *Cognition is situated* – that our cognition is 'in' some context and the interrelations are important, usually framed as inputs and outputs.

(2) *Cognition is time pressured* – a position similar to that of situated cognition but based on immediately situated stimulus-response situations.

(3) *We off-load cognitive work onto the environment* – as an extension of (1), that there may be a deeper 'transaction' between cognition and context, in which the separate

entities are more contributive and complex than input/output etc.

(4) *The environment is part of the cognitive system* – that cognition is distributed across the interrelations between people, things, and contexts.

(5) *Cognition is for action* - this view takes a purposive approach to cognition attempting to explain a stimulus-response system in terms of its 'functional relevance'.

(6) *Offline cognition is body based* – that non-bodily cognition is influenced or constructed by embodied events and that these are then 'co-opted' for other cognitive actions.

Each of these views extends (or contracts) the boundary of embodiment by applying some wider theory or explanation, from direct stimulus-response to the near-epiphenomenal offline cognition. Note that no view attempts to explain (or incorporate) multiple positions and this is central to Wilson's general argument: that embodied cognition should not be treated as only one of these views but that each may, on its merits, provide some useful contribution to the overall subject. Following on from this observation it is argued that this is also true for other views of embodied cognition – that the utility of the frame is what is most valuable within many (if not all) knowledge domains. Which leads to the question of what might be framed when considering boundaries of embodied cognition; and not simply those considered purely ontologically.

2.3 Mind and context

As with the boundary between mind and body, the boundary between body and context is a contested one. This use of objects outwith the body is perhaps most famously articulated in the 'blind man's stick' example, given by Merleau-Ponty (1962), Bateson

(1987), and Planyi (in Malafouris (2013)). This poses the question of where the boundary between mind and body might be for someone using an object to interact with and conceptualise the world. Note that it is not enough to take a reductionist approach to this problem – trivially one could focus entirely on the 'inputs' to the skin of the hand holding the stick. But we are asking how this perception leads to a greater *conception* of space and, in turn, how this conception affects perception. This is a non-trivial problem that involves the bringing together of a number of aspects of cognition, from spatial memory to cultural and psychological preferences and beyond. The neural activity in the skin is a contributor, not the sufficiently causal entity. Beyond this argument, perception is only one aspect of cognition that might be considered as embodied with objects or environment. Wilson's offline cognition is the extension of 'thinking' *using* embodiment, objects our environment, etc. and we rely on these artefacts to reduce the cognitive load (hence energy) we use. For example, if you are writing in the margins of this paper you are doing just that – offloading cognitive load to your context and environment (e.g. Kirsh and Maglio 1994; Aizawa 2014).

With such expanded views of embodied cognition, we are considering more of an ecology of mind (Gibson 1966) – our perceptual and conceptual systems are embodied in absolutely critical ways within our environment, including less material percept-conceptualisations. For example, Sartre's extension of subjective conceptualisation of 'the other' depends on a wider embodied cognitive boundary (Gallagher 2014) can also be considered to align with Haldrup, Keofoed, and Simonsen's (2006) conceptual structures of social interaction through 'embodied othering'. Or Malafouris' Material Engagement Theory (MET) hypothesising the inseparable interrelationship between the cognitive and material culture through human history in terms of archaeo-cognitive embodiment (Lambros Malafouris 2013; L. Malafouris 2012), could be considered

similar to the implicit (embodied) epistemes proposed by Foucault (2002).

If our material cultures are part of our embodied cognition then we must also ask whether the non-material aspects of culture can also be relevant, such as our personal, social and political identities and realities. The development of our neocortex in comparison to other animals is largely due to social factors and development (e.g. Dunbar 2009), so it should be unsurprising that, in taking an embodied cognitive view, we must consider the interrelations between the *conceptual* embodiments we create for ourselves. These can range from the socio-political embodied cognitive boundary that is part of a 'The health event' (Kraftl and Horton 2007); the psycho-socio-spatial milieu of the family photograph (Rose 2004); the global disembodied geopolitics of the (all too embodied) human state of fear (Pain 2009); or even the materiality of boredom and hope (Anderson 2004).

Such considerations have been a significant part of human and emotional geography over the past few decades as part of a wider exploration of the non-representational. But what is emphasised here is the pragmatic and embodied nature of these conceptions: no matter what they might be, they have a physical effect in the world through them *being* conceptual. When we think, we are engaging in a physical activity no matter how nonrepresentational it may *seem* to us. At the same time we must acknowledge the lack of access we have to such activity – the current estimate is that we are unaware of about 90% of cognition (Lakoff and Johnson 1999). This is neither a reductive empiricism or trivial intellectualisation – it is a statement of pragmatic reality which recognises that ideas such as society, fairness, affect, etc. have an embodied component that is physically realised at some point. This embodiment has physiological consequences on our very thinking, hence our knowledge and epistemologies. It is the pragmatic joining of such empirical and theoretical work that is the emerging value here (see Michaels &

Palatinus (2014) for examples.

Without wishing to pre-empt arguments to come, Lorimer's (2005) recognition that (valid) criticisms around representation do not simply have to infer its negation or antithesis is an important realisation. Regardless of the paucity of any epistemic duality, the point emphasised here is that 'more-than-representational' entities are an essential *inclusion* in the ever-expanding embodied cognitive boundary (indeed, the very notion of non-representational may not be possible in an embodied ecosophy). Now that the exploration has reached this point it is time to consider the metaphor of boundary itself.

2.4 The boundary problem

From the preceding sections there remain several issues of delineation. In our physical environment it is difficult to state precisely where cognition might 'end' physically or materially. When considering this boundary through time, culture or politics there is a similar problem – at what point do our ideas become reality and our realities in turn affect our ideas? We come to one of the challenges of embodied cognition of any kind – where the boundary of mind and body, environment or the social might actually lie.

This is, however, a problem of conceptualisation and knowledge as well as the application of that knowledge to the thing we are trying to say something of. In fact it is argued to be an embodied form of knowledge itself – whether the reader prefers to view these as Shapiro's *Conceptualisations* (Shapiro 2011) or Lakoff and Johnston's *body schemas* (Lakoff and Johnson 1999), there is sufficient evidence to link the embodiment of boundary with the concept of boundary (if indeed the two may be separated!). We conceive of a line (or container) and immediately place things on one side or the other, or as inside and outside of a closed line. The irony here is that, in trying to know something about the objects of study, we cannot ignore how we do that knowing.

The other major problem of the problem with boundaries is one of scale. We have already seen that a reductionist view of mind and body is insufficient to describe certain phenomena, qualities or events in the world (or our experience of the world). When we reduce, we are able to say certain things with greater certainty but are far less able to relate these to their wider context. For example, in focusing on the purely physical we may be led to the surface properties of skin and nerve endings and we are then engaged in a specific subject and mode of inquiry. The temptation is to then relate some detail like this to some wider concept without recognising that this shift in focus and mode has taken place. Dawson (2014) summarises this problem of *underdetermination* perfectly using Chomsky's phrase 'the poverty of the stimulus'. You cannot explain the phenomenon of writing by only analysing the contact between pen and skin.

Conversely, the relativist opposition to reduction and opening of the problem does not help either. By creating an ever-expanding list of what and where such boundaries might be ultimately leads to the 'relativist trap' of it becoming 'everything and nothing'. For example, Deleuze and Guattari (1987) discuss the Body without Organs (BwO) as representing a form of trans-embodiment – a palimpsest of thinking and thought, where contradictions (such as dualities) are simply part of the ecology itself. What they cannot do is ground these contradictions in anything other than metaphors and statements – the ideas continue to expand and remain only that: ideas (almost) without body.

The failure to solve the boundary problem gives us an example of precisely the scale of difficulty faced in tackling this problem – one of all of epistemology, ontology and teleology conflated. The very questions we end up asking inevitably provide their own answers (or lack thereof) according to those very questions themselves. In many ways, a question is the worst normative duality humanity can produce and not simply because it infers a preference for the representational (Harrison 2007a) – before even that

assumption, it requires there *may be* an answer. Clearly, we need an alternative to the boundary question - perhaps even to 'unask the question' (Pirsig 1991).

3. Reassembling dualities

3.1 Un-dividing the world

In many ways it is easy to be seduced by a question such as 'where is the boundary between X and Y?' This is a sticky idea indeed – it is readily understood and engages the inquirer. But by starting with such a question we are in some way establishing an epistemology before even coming to know something – we assume there is a boundary in itself; we assume it to have some location; we assume this can all be communicated; etc.

These are all problems of epistemology applied to knowledge of the subject – that is, we are using a system of knowledge to do some knowing about something. But what we are considering are complex interrelationships of people, contexts and entities – a subject domain in which modern human geography has made significant progress over the last century, as has already been noted. In this domain certain key themes emerge repeatedly. For example, the challenge of embodiment is necessarily spatial – it relies on some physical grounding or at least some conception of the relational, which is in itself spatial. But at the same time these ontlogical entities are also necessarily social, political, cultural – more-than-representational. And, finally, beyond even this there are the 'meta' problems of generating these categories at all (Colls 2012). How such apparent complexities and tensions are resolved is the underlying problematic within this ongoing discourse.

In philosophy, the 'putting back together' of mind and body was (arguably) most

explicit in phenomenology throughout the 20th century: Husserl's object potentials offered an alternative consideration of mind and body; Heidegger's *Zuhanden* (ready-to-hand) suggested that our conception of the pen can never be the same after we experience it (Heidegger 1962); and Merleau-Ponty proposed that both object and conception of object cannot exist without one another, making both *necessary* conditions (Merleau-Ponty 1962), a similar position taken by Sartre with respect to the observed object.

Phenomenology, as a method, still has a strong contribution to make in the general domain of human geography (e.g. Pile 1993; Simonsen 2013) and embodied cognition itself (Gallagher 2014). Such approaches typically attempt to move away from a normative duality of person and object to subtler conceptions of interrelations.

Whilst the methods developed and used in recent phenomenology provide a useful theory and set of tools for inquiry, the focus of the argument presented here is the grounded embodied, as opposed to the embodied subjective. It is also important to realise and recall the distinction between phenomenological theory and methods – a distinction which will become an important part of the later discussion. The inherent subjectivity of both the philosophy and method are part of the self-referential problem identified by Pile (1993), a problem that resolves in an interesting way if an extended, embodied view of cognition is taken.

3.2 Ecologies of thought

The question of how we might move beyond structures of thinking that inherently affect the concepts and ideas generated was a particular preoccupation of thinkers at the end of the 20th century. For example, the emergence of attempts to re-conceive relational rather than structural approaches: Giles Deleuze and Felix Guattari's plateaus and rhizomes

(Deleuze and Guattari 1987); Michele Foucault's 'method' of deconstruction of normative reference frames and historicity (Foucault 2002); or Bruno Latour's (Latour 2007) Actor Network Theory. All of these movements share a common conception – that normative traditions have led to some limitation of progress in thinking. The complexity of the entities themselves, as well as the embodiment of the inquirer with those entities, creates a particularly tangled and recursive series of problems.

What we are dealing with is some form of palimpsest of elements, relations, propositions, concepts, etc. We have what could be considered an ecosystem of things intimately linked (if indeed inseparable from) how we think about them. This is perhaps closer to the ecology of thought described by Bateson (Bateson 1987), although an ecology is perhaps a difficult term here. When considering any ecology there immediately arises the problem of what the subject(s) of study really are. Most ecologies end up being defined by their very constituents and boundaries – ecology is a specific term and is therefore limited by that very definition, as Næss himself stated (Næss 1973). Even a conceptual, ecological approach still follows a mainly normative pattern, a specific (or inferred) epistemology about which we may proceed in some way – in Bateson's case a (preferred) scientific method. However, the specific scales of consideration (from detail to system) are a particularly important aspect of Bateson's conception and a vital step in acknowledging the place of people in knowing. The detail is both contributive to, and dependant on, the system and the ontological and epistemological aspects of such scales have a recursive effect in the system. Importantly, it at least recognises the problems that may arise if the 'knower' is ignored in the act of knowledge-making, an approach perhaps seen in Ritchey's analysis of Riemann's self-reflection of his own construction of knowledge around the human ear (Ritchey 1991).

For Bateson, the identification of self and separation of individual from context was pathological in people – an emergent aspect of being in an ecology. But the particular aspects of embodiment he proposes are still normative in certain critical respects – to progress and consider the boundaries of an ecology of embodied cognition we return to the relational and consider ecosophy (ecological philosophy) of the kinds imagined by Arno Næss and Felix Guattari.

3.3 Nææss' ecosophy

For Næss, ecosophy is inextricably linked to value positions (ethical and moral) held towards and within physical ecologies: "…a philosophy of ecological harmony or equilibrium." (Næss 1973, 99). It is presented as part of a wider manifesto, which includes the central premise that humanity has no right to claim any kind of special position within an ecosophy. From this anti-anthropocentric starting position, Næss explores the characteristics of his emerging ecosophy.

Unfortunately, there are problems with Næss's view of ecosophy as initially constructed. In fact, it is essentially a series of moral (and sometimes ethical) positions on current issues of that time. Many of these issues are still relevant today but may, or may not, be relevant at some later point in history. The relativist nature of any form of contestation around value systems is completely missing because it presents a single set of such values as complete. This criticism is summarised well by Keller (2009), presenting critiques of the deep ecology movement generally.

Similarly, Næss acknowledged the difficulty in removing the primacy of an anthropocentric position given the practical considerations, but provided no way to mediate this practically (ethically or morally). From an embodied cognitive perspective, there is simply no way to avoid *being* anthropocentric – but how we might deal with the

consequences of this is of relevant interest. Again, this is quite obviously lacking in Næss's presentation of ecosophy.

Which is unfortunate because there is something interesting in the initial construction of the concept that is recognisable in many of the other philosophical movements of the period. For example, that an ecosophy should be concerned with relations within some 'space' instead of individual elements within an anterior, extant environment: "(1) Rejection of the man-in-environment image in favour of the relational, total-field image." (Næss 1973, 95). What is interesting is that this is situated in a context, the 'total-field', which is constituted *from* these embodied object-relation entities, although this is not really explored formally by Næss.

A second important point (one examined later in this paper), is the recognition of a limitation with normative dualities and seeking to position ecosophy as some new way of engaging both:

> Ecology is a limited science which makes use of scientific methods. Philosophy is the most general forum of debate on fundamentals, descriptive as well as prescriptive, and political philosophy is one of its subsections. (Næss 1973, 99)

Which provides us with the intriguing potential of blending two significant modes and contexts of thinking. As before, this is not developed significantly and, in truth, Næss is presenting concepts similar to others in philosophy (especially phenomenology) at that time.

As with many thinkers starting from the normative position the very language of entities and relations prevents any truly new language to emerge, potentially restricting any new meanings or concepts. We will return to this problem of language later but first must consider the other major contributor to the concept of ecosophy.

3.4 Guattari's ecosophy

Guattari's ecosophy is also driven by a moral starting position, principally around the consequences of human activity in the natural environment, but also with respect to human values. Guattari presents a triptych of headings which form an overall ecosophy: social, mental and environmental ecologies (alternatively the socius, psyche and 'nature' (Guattari 2000, 41)).

As with Næss, Guattari's ecosophy rejects boundaries, even those that may be created or imagined by the three ecologies set out. Thus, he is clearly inferring embodiment of different varieties. But unlike Næss, Guattari does discuss the epistemology of ecosophy, by starting with the observation that each ecology is governed by a different logic that has, typically, nothing to do with normal conversation: "It is a logic of intensities, of auto-referential existential assemblages engaging in irreversible durations." (Guattari 2000, 44)). These logics, then, are relative and emergent, defined by what they are becoming (and this, in turn, being/becoming the ecosophy itself). Indeed, Guattari uses the vector as a metaphor suggesting some notion of spatio-temoprality intrinsic to these relationals. This tension between unfocused but clearly stated definitions is a problem we will return to later.

But there is a deeper value system in operation implied by Guattari's ecosophy that is of particular interest to this paper: it is not simply a positioning of value as a human artefact, but one intimately intertwined with knowledge in itself. This is presented via a critique of modern culture and society, particularly in terms of the antipathy we may have 'inherited' from structuralism and postmodernism. What is of interest here is that Guattari is inferring that what we know of the world is affected by how we come to know as an aspect of the ecosophy in itself. Guatari infers, but does not state, an

extended *embodied* view of ecosophy.

4. Embodying ecosophy

We now draw together some commonalities from the ecosophies of Næss and Guattari, and consider criticisms of each. At the same time we introduce some of the concepts and ideas from embodied cognition in the first section as critical elements that have to be addressed in any updated ecosophy. The following sections take common themes between these two ecosophies, consider criticisms of these themes and then apply an embodied cognitive view to them. The intention is to test whether such criticisms can be addressed and the result may hold some value. The initial premise is that an embodied cognition without boundaries (or at least 'agnostic' as to whether boundaries are relevant to start with) would necessarily be an ecosophy in any event.

4.1 Anthropocentrism and cognition

Both ecosophies are strongly anthropocentric, albeit in different ways and to different purposes. For Næss it is explicit in forming the underpinning of his main ethical position: that human beings have no intrinsic right to assume an imbalance through supremacy within an ecology. For Guattari the anthropocentrism is explicit and based on his work with Deleuze on subjectivities but placed slightly differently to Næss in terms of emerging from a 'healthy' ecosophy. The term healthy is used here to infer the subjectivity of Guattari's own ethical preferences for an ecosophy. For example, the matter of children's comics is a value position conflated with the rest of the philosophy but which is really not demonstrated fully, other than as a subjectivity of culture. But it is difficult to support such specific examples – some of the greatest pieces of socio-political criticism arguably come from graphic novels and 'comics'…

In effect, both are attempting to claim that the values they promote either lead to or are a consequence of their respective philosophies. Both are unable to remove their own subjectivities from the philosophies themselves, leading to specifics of morality, not philosophies or ethics. This is in no way a criticism – it is a notable and explicit issue in Bateson's ecology and it is central to any discussion on subjectivities: how do we treat the range of subjectivities that naturally occur in any cognitive act – especially *the* central subjectivity in that act: ourselves?

We are attempting to consider cognition by *thinking* about it. Essentially we are attempting to take a consciously rational approach to an empirical situation – we have an embodied 'knowledge' of the concept about which we are discussing and, at some point, we begin to rationalise it using logic: a different form and process of knowing. It turns out that such types of rationalisation of conflated prior knowledge are a fundamental aspect of human cognition. For example, we use rhetoric, alternative logics and rationality in motivated reasoning to explain decisions we make 'subconsciously', such as preferences, ethical decisions, and moral choices (Kunda 1990, e.g.; Dunning 2006; Mazar, Amir, and Ariely 2008; Gino and Ariely 2012). This process can even extend to allow us to rationally incorporate empirical contradictions, such as how we explain (rationalise) the feeling of 'cold' when we touch metal or 'warm' when we touch wood. The 'truth' of thermal transmittance is relevant only when we choose to make it so by embodying it. Cognitive processes such as these should be instrumental to anyone wishing to understand how we come to know.

Epistemological dualities are a further example of this. Cognitively, it is far more energy efficient to say 'black is the opposite of white' rather than to inquire into the nature of 'greyness'. So, despite any possible rationale presented we will still *believe* in the metaphor 'on the other hand' and create the (lazy) epistemology of duality (thanks

to our bilateral symmetry, as well as a slight preference for one or other of those hands). These forms of knowledge are typically presented as rhetorical devices but it is argued here that they are far more than this – they are embodied cognitive epistemes and are no less a form of knowledge. By treating them as rhetorical or as any device other than an episteme, they are left implicit and forgotten rather than considered and resolved in the knowledge being constructed.

This all leads to a second more subtle form of anthropocentrism contained in almost all thinking. This is the assumption that we 'own' our ideas – that we are somehow able to control them and apply them at will. As presented in the first section, a common correlation with anthropocentrism is the assumption that the 'anthro' part is mainly, or even only, our Cartesian minds – in effect a form of sképsicentrism (with apologies for the neologism). This centrism is utterly human and appears to simply be a common sense subjectivity (Hastorf and Cantril 1954), leading to 'multiple readings of reality' (Charmaz 2000). But by simply accepting such subjectivity 'as is' we conveniently ignore how much other cognition takes place without us being consciously aware of it or as part of our physiology itself. Our subjectivities are far less 'our own' than we realise.

All of these issues can be summarised in this way: we are not fully aware of *how* we think, *what* affects our thinking and how that thinking *affects itself*. Bateson's position on subjectivity was that it was pathological; but evidence from embodied cognition suggests that it is not – it is very normal, intrinsically inevitable, and utterly unavoidable. The problem is that this very subjectivity hides an epistemological vacuum at the centre of the anthropic: that 'I' am not the only aspect of my own cognition – indeed, 'I' is the least part of it.

This is, perhaps, the strongest argument of (and for) an ethics of embodied cognitive ecosophy – it necessarily has to concede its own construction by recognising that we are embodied cognitive beings and that this requires a wider ecosophy of embodiment in the social, political, cultural, historical, etc. It could be summarised by:

We are a necessary (*but insufficient*) part of our own cognition.

4.2 Conceptualisation and embodiment

As suggested previously, the very language used is a challenge in itself because there is an extant, normative 'ecology of thought' through shared language. Many words have complex, distributed and even multiple meanings, at best leading some to accept that they are merely representations, not propositions, in themselves, for example consciousness (James 1904) or creativity (Coyne 1997). At worst, they are part of the problem itself – as Bateson suggested:

> For the sake of politeness, I call these "heuristic" concepts; but, in truth, most of them are so loosely derived and so mutually irrelevant that they mix together to make a sort of conceptual fog which does much to delay the progress of science. (Bateson 1987, 4)

It is perhaps unsurprising, then, that Næss and Guattari present only a *conception* of what an ecosophy is in practice. The immediate consequence of this is that both have to maintain a relational approach without falling into the 'relativist trap' of being unable to say anything about anything. Næss attempts to avoid this by blending ecology with philosophy, maintaining distinct methods and attitudes – in fact, insisting that his ecosophy is completely normative in nature and criticisms of this position abound (e.g. Keller 2009). Guattari relies more on his usual style of writing, particularly recognisable from his work with Deleuze, where rhetoric, symbols and metaphors are used to convey

complex concepts.

The language used is necessarily difficult because it is the concept that matters. This then leads us to ask whether we need a new language to consider these complex, emerging concepts. This is difficult, however, when embodied cognition is considered. Firstly, as we have seen, our language is part of our embodied cognitive nature, hence we would necessarily be creating a language using … language. We can no more construct it from scratch than we can remake our own brain from a pile of hydrocarbons on a table. Secondly, our language is embodied across time and culture as well as our physiology – it is an intrinsic part of what we are because it is how we came to be.

This then leads us to consider whether or not it is possible that concepts have direct relations to what we say of them. For Frege this was without doubt: 'meaningful sentences express thoughts', requiring that some relation exists between metaphysical logics and human realities. Even for Bateson there remained some separation of *categories* of concepts, in itself a concpetualisation: "…mental process, ideas, communication, organization, differentiation, pattern, and so on, are matters of form rather than substance." (Bateson 1987, 11).

Embodied cognition, however, suggests that concepts cannot be represented simply or even rationally in two 'spaces' at the same time – it (not they) must be embodied in some way. Moreover, this very embodiment requires the reconstruction of concepts with each and every expression of them. Landauer's point in arguing the physical nature of information is relevant here – that we are easily : "…misled into thinking about information as a classical entity." (Landauer 1996).

In fact, this is argued to be central to the mind/body problem as well as its siblings the symbol grounding problem (Harnad 1990) and data grounding problem (Floridi 2004).

By using reductive methods to create entities such as mind/body, sign/signifier, or data/meaning we are immediately *creating* dualities that cannot be reconciled because we have reduced the gestalt to constituent parts that are no longer the original conceptualisation. This, then, might represent a partial response to any grounding problem(s) through embodied cognition – there is no grounding because there are no boundaries between 'not-grounded' concepts and 'grounded' expressions of these ideas. Specifically, we mostly conflate epistemology with ontology because we fail to take account of embodied cognition and its effect on our knowledge.

This, then, is the tension intrinsic to knowing within an embodied cognitive ecosophy – to go about knowing something we have to use some method of knowing. In using such a method, the danger is that it that we forget the embodied cognitive ecosophy within which this method is applied. For example, if we take a reductionist approach, we are then 'inside' the ecosophy within which we are considering and can only look 'inwards' to establish greater detail. Similarly, if we take a relativist approach, we might look 'outwards' and add elements we can find relating to our subject of interest.

For example, the criticism of Descartes' position on mind/body duality is not in itself a failure of reductionism – it is a failure in *application* of reduction with respect to the conceptual ecology within which it is being asked to make a contribution. This is another isolated subjectivity 'trap'. It is very easy to simply trust that science 'knows' something or to believe that philosophy 'knows' something. In both cases they may *infer* some knowledge, but this knowing comes with conditions that arise from their position in the embodied cognitive ecosophy. Consider once again the scales of thinking in Bateson's Ecology (Bateson 1987) or Riemann's self-reflection of his analysis of the human ear (Ritchey 1991). Both 'systems' understand precisely this problem of reductionism without understanding its value in context (as well as, by the way, the

problem of relativism ignoring the value of reductionism). This is perhaps the response to Harrison's (2000) dichotomy when considering Nietzche's "'eternals' and 'essentials'" – both are necessary, either through choice or ignorance.

In both of these examples we have used a method to know something and in doing so we have to isolate the method from the ecosophy in order to make progress. The problem that arises is that, when we create such separations *without recognising they were/are embodied* and then go on to assume they have greater significance in and of themselves, we generate false knowledge or infer a confidence in knowledge that is unwarranted. It is suggested here that this has an important relevance to problems of argument around representation - it's very easy to forget what it is we are doing when we try to know something as well as the conditions we infer in doing so. Anyone who cringes at the reporting of science in some media or the continued separation of arts and science in education systems, is recognising a gap in the re-application of knowledge within an embodied cognitive ecosophy.

Generally, it is this process of *electing*, not selecting, that is important to recognise – it is the *process* of selection using some other epistemic mechanism: a structure of knowledge or a knowledge process. In many ways there is no way of considering these matters without coming to some form of Gödellian undecidability and this is indeed the argument put forward here:

We can be certain of some things only by *electing* to ignore others.

4.3 Values and ecosophy

Perhaps the strongest similarity between the two ecosophies is that each takes a value position (moral, ethical or otherwise) in constructing the ecosophy. For Næss, his

ecosophy is effectively a series of *prior* moral positions which are explicitly articulated immediately. In fact, the ecosophy would not exist without the moral positions taken, such as the application of the word egalitarian. For Guattari it is less explicit whether the positions are required prior to the ecosophy, but they are still there in the opinions he conflates with his criticism.

Here, the question of whether any value system is intrinsic to an embodied cognitive ecosophy is important. From a purely relativist point of view, taking account of subjectivities matters, otherwise "…our models will not be fully faithful to the natural vicissitudes of the human mind." (Abelson 1979). By an embodied cognitive view these vicissitudes are central to the embodiment within the ecosophy – they are a natural tension between the embodied, the cognitive, and the ecosophy.

So far such tensions have been presented as a near passive processes, existing internally between mind and body or externally between mind and ecology. In other words, such tensions simply 'are' and do very little beyond existing as epistemic opposing poles. But if they are embodied they are necessarily co-dynamic since the embodiment can only exist through change. Change and difference are therefore yet another necessary condition of embodied cognitive ecosophies, in sense of Bateson's 'difference that makes a difference' (Bateson 1987) or Guattari's ecosophical vectors.

For both ecosophies there is a tension then: they require some form of value position(s) to be taken in order to maintain (or even generate) the philosophy but this value cannot be anterior to the ecosophy itself. This follows directly from the general embodied cognitive argument, leading to any concepts we do create necessarily being embodied. Hence, any anterior views can only *appear* epiphenomenal or metaphysical. This includes any concepts of values, meaning value systems can only be achieved from

within (and as part of) the ecosophy. Any notions of justice, morality, or any other values are (like concepts) necessarily incomplete. This is perhaps why we see 'natural' and emergent systems of justice arising in certain polities, rather than some single human sense of right and wrong – these have been very necessary social constructions in creating a suitably sustainable social. It also perhaps suggests why conceptual gestalts, such as 'dwelling', 'creativity' or 'consciousness' seem to be such simultaneously simple and complex ideas (Harrison 2007b).

Once again, it is the detail that matters here. By adopting such a system (and besides the conditions already outlined), choices are elected: inclusion and exclusion, change according to social opinion, etc. Thus, when we transfer or communicate systems of values we do more than simply transfer concepts; we extricate a series of elements from the cognitive embodied ecosophy. It can only ever be the *elected* certainties in the embodied cognitive ecosophy, whether these are un/intentional or un/conscious. Instead of an emergent value system we end up with a rigid set of entities that appear objective and immutable. The real problem comes when we start to think such a system is, in itself, the *entirety* of the ecosophy or that there is no wider ecosophy within which the system emerges. This leads to assumptions of infallibility, completeness, or even fairness. When we assume otherwise we infer a closed system that is necessarily an isolated subjectivity – only the individual holders of each concept will know their own lists of 'good' or 'bad'. When we reduce aspects of the ecosophy and ignore the context when it is clearly relevant, we are left with an isolated boundary: a conceptual spatiality that only has definition by its own construction.

It is argued that 'good' or 'bad' ecosophies are isolated subjectivities of this kind – epiphenomenal-like concepts used to justify the extraction or avoidance (implicit or tacit) of entities from the wider ecosophy. The degree to which subjectivities are

isolated is the degree to which they lead to instabilities (asymmetries and artificial spatialities) in the ecosophy. This is perhaps a clue as to the constant emergence of such asymmetries – imbalances of power and structures around gender, race, or any notion of other are not only isolated subjectivities, they emerge readily as structural asymmetries of thinking and concepts. It is this dynamic (im)balance that is argued to reflect the relational and emergent concepts of plateaus and rhizomes, concepts shared more directly between Bateson and Guattari (and Deleuze) than is perhaps realised (Shaw 2015).

By this view, it is argued that ethics is a manifestation of structures *created by acknowledgement* of subjectivities within the ecosophy. Similarly, a lack of ethics comes about from failing to recognise and/or act on such acknowledgement. Human social value systems are all based on this action or inaction around acknowledgement, it being an embodied aspect of the ecosophy. To say that such values are relative is simply a fatalist truism – but the argument presented here explains how this is so and removes the fatalism by embodying such relativity as *necessary change* in the continuum of the ecosophy.

We create, or supress, ethics by acknowledging limitations of subjectivities

5. Conclusion

> …a logic independent of the accidental nature of spacetime becomes an idle dream. These conclusions are unpleasant to my vanity, but pleasant to my love of philosophical activity. (Russell 1996)

These words from Bertrand Russell highlight the difficulties in exploring any form of embodied cognition. Thinkers, especially and unsurprisingly, have a preference for thought, making it difficult to accept that it is anything other than what we rationalise it

to be. Embodied cognition requires that we relate to knowledge from an entirely different starting point, the consequences of which have yet to be fully realised.

This paper has introduced embodied cognition and explored the boundaries of such cognition, presenting it as a particularly relational ecology. By synthesising these ideas with ecosophy, some of the criticisms of ecosophical thinking can be addressed and expanded to an embodied cognitive ecosophy. Three characteristics of such an idea have been presented to summarise the arguments, as follows.

We are a necessary (*but insufficient*) part of our own cognition.

If we accept cognition is embodied, we must accept the consequences for epistemology that inevitably follow. How we come to know, and the very fact it is not even 'we' doing the knowing, is only the start of dealing with this. Perhaps like a developing child we must go through a stage of almost 'pure' isolated subjectivity – that we must first construct being with respect to our (apparently) own experiences and knowledge. Perhaps later there comes a point at which these artefacts of knowledge are obviously insufficient to explain and develop new ideas; where we have to move beyond the isolated subjectivities of self to recognise embodied, convergent subjectivities of self within a wider ecosophy. At the very least, for anyone working in any domain of knowledge, being aware of the fact that there are physiological limits to what we are aware of thinking has a significant implication. If this is only framed as *non*-representational then the danger of it becoming ignored exists – it is already difficult enough for most people to acknowledge issues in non-normative representation in the first place. It is argued that Lorimer's reframing of *more-than*-representational (Lorimer 2005) provides a more active conception, an invitation to explore the possibility of other representations.

We become certain of some things only by *electing* to ignore others.

There are no absolute answers unless a system is reduced to such irrelevance as to be meaningless at a human level. This is not a criticism of any epistemologies or methods – it is a criticism of their application and applicability (by people). Unfortunately, the certainty gained from some methods has to ignore other forms of knowing. The first step of recognising which things have been ignored is hard enough – accepting that these choices are *elected*, not selected, is exceptionally difficult. The further irony is that, in trying to maintain several 'scales' of knowledge, the language used becomes necessarily conceptual, rhetorical and heuristic. As such it can also be incredibly persuasive, often leading to these superficial characteristics being conferred with a knowledge they do not actually contain. Once again, the danger is in ignoring this – the certainty that comes from creating a boundary based on exclusion is exceptionally comforting for many people and confronting such exclusions is often difficult. In this, it is worth learning from the experience of performing such confrontation in recent human geography. This is perhaps a slightly more idealistic response to Pile's (2010) 'why?' – because the value of such work in emotional geography is valuable in many other domains.

We create, or supress, ethics by acknowledging limitations of subjectivities

Interestingly this characteristic is arguably the most visible and has been a necessity in social settings for thousands of years in order to reach accommodations between isolated subjectivities. No ecosophy can exist as static and unchanging; as soon as any isolated subjectivity emerges it changes interrelations and negotiations have to take place to accommodate and create a more convergent subjectivity. Idealistically this produces an emergent system capable of dealing with complex and reductive concepts

simultaneously. For example, many systems of justice explicitly incorporate space for action to recognise their own fallibility. But in reality, there are practical limits to the volume of isolated subjectivities that can be accommodated in such negotiations, imposed either explicitly or implicitly. Again, the lesson from human geography demonstrates that balancing power asymmetries is difficult in extant systems – that there are always voices to which less attention is paid. What is perhaps slightly harder to accept is that this view may indeed provide a new way of considering ethics (Popke 2009) – as arising from embodied cognition to form a structurally relational part of the ecosophy.

Finally, and presented with a pragmatic acknowledgement, these are simply realities of (human) being. They arise from us being the objects that we are in the spatiotemporal world we inhabit. This pragmatic observation leads to surprisingly un-pragmatic results and this, it is argued, is the emerging challenge and opportunity offered. It is also a response to the 'why?' asked by Pile (2010): relating the human to the spatial in human geography is non-trivial. As Guattari suggests:

> In the final account, the ecosophic problematic is that of the production of human existence itself in new historical contexts. (Guattari 2000, 34)

Many complex philosophies and theories abound around such a final account. But perhaps a simple, pragmatic, embodied reconsideration provides both the complexity required to approach the more-than-representational as well as the simplicity necessary for coming to understand it with purpose.

Acknowledgements

With thanks to Rob and Gerry for introducing me to ecosophy and helping develop some ideas in a different domain.

References

Abelson, Robert P. 1979. “Differences between Belief and Knowledge Systems.” *Cognitive Science* 3: 355–66.

Aizawa, Ken. 2014. “Extended Cognition.” In *The Routledge Handbook of Embodied Cognition*, edited by Lawrence A. Shapiro, 1st ed. New York: Routledge.

Anderson, Ben. 2004. “Time-Stilled Space-Slowed : How Boredom Matters.” *Geoforum* 35 (6): 739–54. doi:10.1016/j.geoforum.2004.02.005.

Bateson, Gregory. 1987. *Steps To An Ecology of Mind*. Edited by Jason Aronson Inc. 2nd ed. Northvale. http://www.edtechpost.ca/readings/Gregory Bateson - Ecology of Mind.pdf.

Charmaz, K. 2000. “Grounded Theory: Objectivist and Constructivist Methods.” In *Handbook of Qualitative Research*, edited by N. K. Denzin and Y. S. Lincoln, 2nd ed., 359–80. London: Sage.

Chawda, Bejal, Brock Craft, Paul Cairns, Daniel Heesch, and Stefan Rüger. 2005. “Do ‘attractive Things Work Better’? An Exploration of Search Tool Visualisations.” In *19th British HCI Group Annual Conference: The Bigger Picture*, 46–51. http://oro.open.ac.uk/29873/.

Colls, Rachel. 2012. “Feminism , Bodily Difference and Non-Representational Geographies.” *Transactions of the Institute of British Geographers* 37 (3): 430–45.

Coyne, Richard. 1997. “Creativity as Commonplace.” *Design Studies* 18 (2): 135–41. doi:10.1016/S0142-694X(97)85456-7.

Damasio, Antonio. 2006. *Descartes’ Error: Emotion, Reason, and the Human Brain*. London: Vintage.

Dawson, Michael. 2014. “Embedded and Situated Cognition.” In *The Routledge Handbook of Embodied Cognition*, edited by Lawrence A. Shapiro, 1st ed., 59–67. New York: Routledge.

Deleuze, G, and F Guattari. 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*.

Vol. 2. London: The Athlone Press Ltd.

Dennett, Daniel C. 2013. *Intuition Pumps and Other Tools for Thinking*. 1st ed. London: Penguin Books.

Descartes, Rene. 2008. *Discourse on the Method*. Project Gutenberg. https://www.gutenberg.org/ebooks/59.

Dunbar, R.I.M. 2009. "The Social Brain Hypothesis and Its Implications for Social Evolution." *Annals of Human Biology* 36 (5): 562–72. doi:10.1080/03014460902960289.

Dunning, David. 2006. "Strangers to Ourselves ?" *The Psychologist* 19 (10): 600–603.

Floridi, Luciano. 2004. "Open Problems in the Philosophy of Information." *Metaphilosophy* 35 (4): 554–82. doi:10.1111/j.1467-9973.2004.00336.x.

Foucault, Michel. 2002. *The Archeology of Knowledge*. Translated by Tavistock Publications Limited. Vol. 9. London: Routledge.

Gallagher, Shaun. 2014. "Phenomenology and Embodied Cognition." In *The Routledge Handbook of Embodied Cognition*, edited by Lawrence A. Shapiro, 1st ed., 9–18. Oxon: Routledge.

Gibson, James J. 1966. *The Senses Considered as Perceptual Systems*. New York: Houghton-Mifflin.

Gino, Francesca, and Dan Ariely. 2012. "The Dark Side of Creativity : Original Thinkers Can Be More Dishonest." *Journal of Personality and Social Psychology* 102 (3): 445–59.

Guattari, Felix. 2000. *The Three Ecologies*. Translated by I a N Pindar and Paul Sutton. *Earth*. 1st ed. London: The Athlone Press Ltd.

Haldrup, Michael, Lasse Koefoed, and Kirsten Simonsen. 2006. "Practical Orientalism – Bodies, Everyday Life and the Construction of Otherness." *Geografiska Annaler. Series B, Human Geography* 88: 173–84.

Harnad, Stevan. 1990. "The Symbol Grounding Problem." *Physica D* 42: 335–46. doi:10.1016/0167-2789(90)90087-6.

Harrison, Paul. 2000. "Making Sense: Embodiment and the Sensibilities of the Everyday." *Environment and Planning D: Society and Space* 18 (4): 497–517.

doi:10.1068/d195t.

———. 2007a. "'How Shall I Say it...?' Relating the Nonrelational." *Environment and Planning A* 39 (3): 590–608. doi:10.1068/a3825.

———. 2007b. "The Space between Us: Opening Remarks on the Concept of Dwelling." *Environment and Planning D: Society and Space* 25 (4): 625–47. doi:10.1068/d365t.

Hastorf, Albert H, and Hadley Cantril. 1954. "Case Reports. They Saw a Game: A Case Study." *The Journal of Abnormal and Social Psychology* 49 (1): 129–34.

Heidegger, Martin. 1962. *Being and Time*. Translated by John Macquarrie and Edward Robinson. Oxford: Wiley-Blackwell.

James, William. 1904. "Does 'Consciousness' Exist?" *The Journal Of Philosophy Psychology And Scientific Methods* 1 (18): 477–91.

Johnson, Mark, and George Lakoff. 2002. "Why Cognitive Linguistics Requires Embodied Realism." *Cognitive Linguistics* 13 (3): 245–63.

Keller, David R. 2009. "Deep Ecology." In *Encyclopedia of Environmental Ethics and Philosophy*, 1st ed., 206–11. New York: Macmillan Reference USA.

Khun, Thomas S. 1962. *The Structure of Scientific Revolutions*. 2nd ed. Chicago: The University of Chicago Press.

Kirsh, David, and Paul Maglio. 1994. "On Distinguishing Epistemic from Pragmatic Action." *Cognitive Science* 18: 513–49.

Kiverstein, Julian. 2012. "The Meaning of Embodiment." *Topics in Cognitive Science* 4 (4): 740–58. doi:10.1111/j.1756-8765.2012.01219.x.

Koskinen, Ilpo, John Zimmerman, Thomas Binder, Johan Redström, and Stephen Wensveen. 2011. *Design Research Through Practice*. 1st ed. Waltham: Elsevier Inc.

Kraftl, Peter, and John Horton. 2007. "'The Health Event': Everyday, Affective Politics of Participation." *Geoforum* 38 (5): 1012–27. doi:10.1016/j.geoforum.2007.01.013.

Kunda, Ziva. 1990. "The Case for Motivated Reasoning." *Psychological Bulletin* 108 (3): 480–98.

Lakoff, George, and Mark Johnson. 1980. *Metaphors We Live by*. Chicago: University

of Chicago Press.

———. 1999. *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*. New York: Basic Books.

Landauer, Rolf. 1996. "The Physical Nature of Information." *Physics Letters, Section A: General, Atomic and Solid State Physics* 217 (July): 188–93. doi:10.1016/0375-9601(96)00453-7.

Latour, Bruno. 2007. *Reassembling the Social*. 1st ed. Oxford: Oxford University Press.

Lee, Carl, Danny Dorling, Nick Clifford, Jenny Pickerill, and Michael Goodchild. 2016. "Geography's Place in the World." *THE Features*. https://www.timeshighereducation.com/features/geographys-place-in-the-world.

Longhurst, Robyn, Elsie Ho, and Lynda Johnston. 2008. "Using ' the Body ' as an ' Instrument of Research ': Kimch ' I and Pavlova." *Society* 40 (2): 208–17. doi:10.1111/j.1475-4762.2008.00805.x.

Lorimer, H. 2005. "Cultural Geography: The Busyness of Being 'More-than-Representational.'" *Progress in Human Geography* 29 (1): 83–94. doi:10.1191/0309132505ph531pr.

Malafouris, L. 2012. "More than a Brain: Human Mindscapes." *Brain* 135 (12): 3839–44. doi:10.1093/brain/aws063.

Malafouris, Lambros. 2013. *How Things Shape the Mind: A Theory of Material Engagement*. 1st ed. Massachusetts: MIT Press.

Mallgrave, Harry Francis. 2013. *Architecture and Embodiment*. 1st ed. Oxon and New York: Routledge.

Mazar, Nina, On Amir, and Dan Ariely. 2008. "The Dishonesty of Honest People: A Theory of Self-Concept Maintenance." *Journal of Marketing Research* 45 (6): 633–44. doi:10.1509/jmkr.45.6.633.

McEwan, Cheryl, and Michael K. Goodman. 2010. "Place Geography and the Ethics of Care: Introductory Remarks on the Geographies of Ethics, Responsibility and Care." *Ethics, Place & Environment* 13 (2): 103–12. doi:10.1080/13668791003778602.

Merleau-Ponty, Maurice. 1962. *The Phenomenology of Perception*. International

Library of Philosophy and Scientific Method. Routledge. doi:10.1111/j.1468-0149.1963.tb00795.x.

Michaels, Claire F., and Zsolt Palatinus. 2014. “A Ten Commandments for Ecological Psychology.” In *The Routledge Handbook of Embodied Cognition*, 1st ed., 19–28. Oxon: Routledge.

Mingers, John. 2001. “Embodying Information Systems: The Contribution of Phenomenology.” *Information and Organization* 11 (2): 103–28. doi:10.1016/S1471-7727(00)00005-1.

Næss, Arne. 1973. “The Shallow and the Deep, Long-range Ecology Movement. A Summary.” *Inquiry* 16 (1–4): 95–100. doi:10.1080/00201747308601682.

Nash, C. 2000. “Performativity in Practice: Some Recent Work in Cultural Geography.” *Progress in Human Geography* 24 (4): 653–64. doi:10.1191/030913200701540654.

Norman, Donald A. 2005. *Emotional Design - Why We Love (or Hate) Everyday Things*. New York: Basic Books.

Pain, Rachel. 2009. “Globalized Fear ? Towards an Emotional Geopolitics.” *Progress in Human Geography* 33 (4): 466–86. doi:10.1063/1.2756072.

Pile, Steve. 1993. “Human Agency and Human Geography Revisited: A Critique of ‘New Models’ of the Self.” *Transactions of the Institute of British Geographers* 18 (1): 122. doi:10.2307/623072.

———. 2010. “Emotions and Effect in Recent Human Geography.” *Transactions of the Institute of British Geographers* 35 (1): 5–20.

Pirsig, Robert. 1991. *Zen And The Art Of Motorcycle Maintenance: An Inquiry into Values*. London: Vintage.

Popke, J. 2009. “Geography and Ethics: Non-Representational Encounters, Collective Responsibility and Economic Difference.” *Progress in Human Geography* 33 (1): 81–90. doi:10.1177/0309132508090441.

Quine, Willard V O. 1951. “Two Dogmas of Empiricism.” *Philosophical Review* 60 (1): 20–43. doi:10.2307/2266637.

Ritchey, Tom. 1991. “Analysis and Synthesis On Scientific Method - Based on a Study

by Bernhard Riemann." *Systems Research* 8 (4): 21–41. doi:10.1002/sres.3850080402.

Rose, Gillian. 2004. "'Everyone's Cuddled up and It Just Looks Really Nice': an Emotional Geography of Some Mums and Their Family Photos." *Social & Cultural Geography* 5 (4): 549–63. doi:10.1080/1464936042000317695.

Russell, Bertrand. 1996. *History of Western Philosophy*. 2nd ed. London: Routledge.

Searle, John R. 1980. "Minds, Brains, and Programs." *Behavioral and Brain Sciences* 3: 1–19. doi:10.1017/S0140525X00005756.

Shapiro, Lawrence A. 2011. *Embodied Cognition*. New York: Routledge.

Shaw, R. 2015. "Bringing Deleuze and Guattari down to Earth through Gregory Bateson: Plateaus, Rhizomes and Ecosophical Subjectivity." *Theory, Culture & Society* 32 (7–8): 151–71. doi:10.1177/0263276414524451.

Simonsen, Kirsten. 2005. "Bodies, Sensations, Space and Time: The Contribution from Henri Lefebvre." *Geografiska Annaler: Series B,* 87: 1–14.

———. 2013. "In Quest of a New Humanism Embodiment, Experience and Phenomenology as Critical Geography." *Progress in Human Geography* 37 (1): 10–26. doi:10.1177/0309132512467573.

Velmans, Max. 1990. "Consciousness, Brain And The Physical World." *Philosophical Psychology* 3 (1): 77–99.

Wilson, Andrew D, and Sabrina Golonka. 2013. "Embodied Cognition Is Not What You Think It Is." *Frontiers in Psychology* 4: 58. doi:10.3389/fpsyg.2013.00058.

Wilson, Frank R. 1998. *The Hand: How Its Use Shapes the Brain, Language, and Human Culture*. New York: Pantheon Books.

Wilson, Margaret. 2002. "Six Views of Embodied Cognition." *Psychonomic Bulletin & Review* 9 (4): 625–36. http://www.ncbi.nlm.nih.gov/pubmed/12613670.